

# A comparison of middle – aged and mature forest stands of grey alder *Alnus incana* (L.) Moench in Viesīte Country

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## Introduction

In Latvia forest plays an important role in biodiversity. The total area of woodland in Latvia is 3 million ha or 46,6 % of the territory of Latvia but forest coverage is 50,9 % (State forest service, 2012).

The grey alder is a common species in Latvia. It occupies 7 % of the total forest area in Latvia (State forest service, 2012).

The grey alder plays an important role in forest ecosystems. The grey alder has a shallow root system and litter of leaves have rich humus. Wherewith grey alder forests are typical of the species that grow in nitrogen – rich soils.

Perhaps owing to the low-grade wood of grey alder there is little scientific research on the grey alder forest vegetation diversity in Latvia. But even this species forms biodiversity significance stands with their own unique value that should be studied and analyzed.

In present study we investigated the vegetation diversity, the structural element differences between middle – aged and mature grey alder forest stands.

## Aim and objectives

The aim of this study is to estimate vegetation diversity on grey alder forest stands.

First, we evaluate the grey alder forest stands in Latvia. Second, we evaluate the forest stand structural elements on grey alder forests and furthermore, we evaluate the vegetation diversity on these stands.

## Materials and methods

The study was carried out in country Viesīte, south – eastern part of Latvia. The vegetation diversity, the volume of living trees and coarse woody debris of 3 pairs of middle – aged (32 – 42 years old) and mature forest stands (53 – 57 years old), presenting *Aegopodiosa* forest site type, were estimated. The size of each plot is 20m × 20m.

Braun – Blanquet method has been used to assess the projective coverage (%) of vegetation within tree layer (E3), shrub layer (E2), herb layer (E1) and moss layer (E0) (Braun – Blanquet, 1964; Pakalne, Znotiņa, 1992).

Statistical significance of the differences between forest stands and vegetation layers was determined by two – way ANOVA models (analysis of variance) (Arhipova, Bāliņa, 2006).

We tested the frequency class (I-V) for each species (Muller – Dombois, Ellenberg, 1974).

We calculated the Ellenberg scores for herbaceous species of the response to abiotic factors (Ellenberg et al., 1992).

## The differences between middle – aged (Fig. 1.) and mature (Fig. 2.) grey alder forest stands (photo S. Sirmoviča)



Fig. 1.



Fig. 2.

## Results

There were 75 vegetation species in the forests of grey alder, including species of trees – 12, shrubs – seven, herbage – 48, moss – eight.

The total number of species was 44 in middle – aged forest stands and that in 55 in mature forest stands (Figure 3). This means that the older stands are more variety of circumstances. In additional, the nemoral forest type species has been dominated in grey alder forest stands.

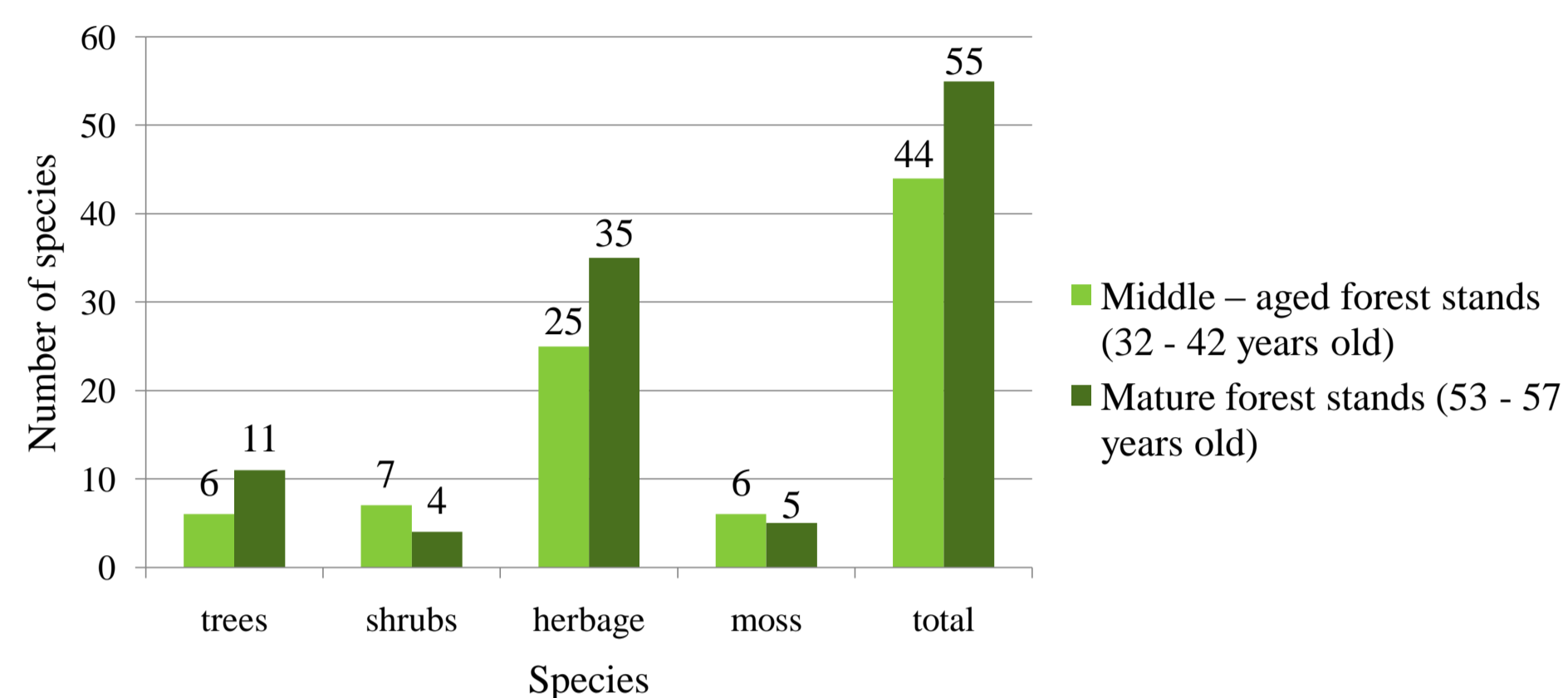


Fig. 3. The number of species by stands and within different age classes.

In middle – aged forest stands the average projective coverage is higher than in mature forest stands. The average projective coverage between stands differs from 10% to 26% (Figure 4).

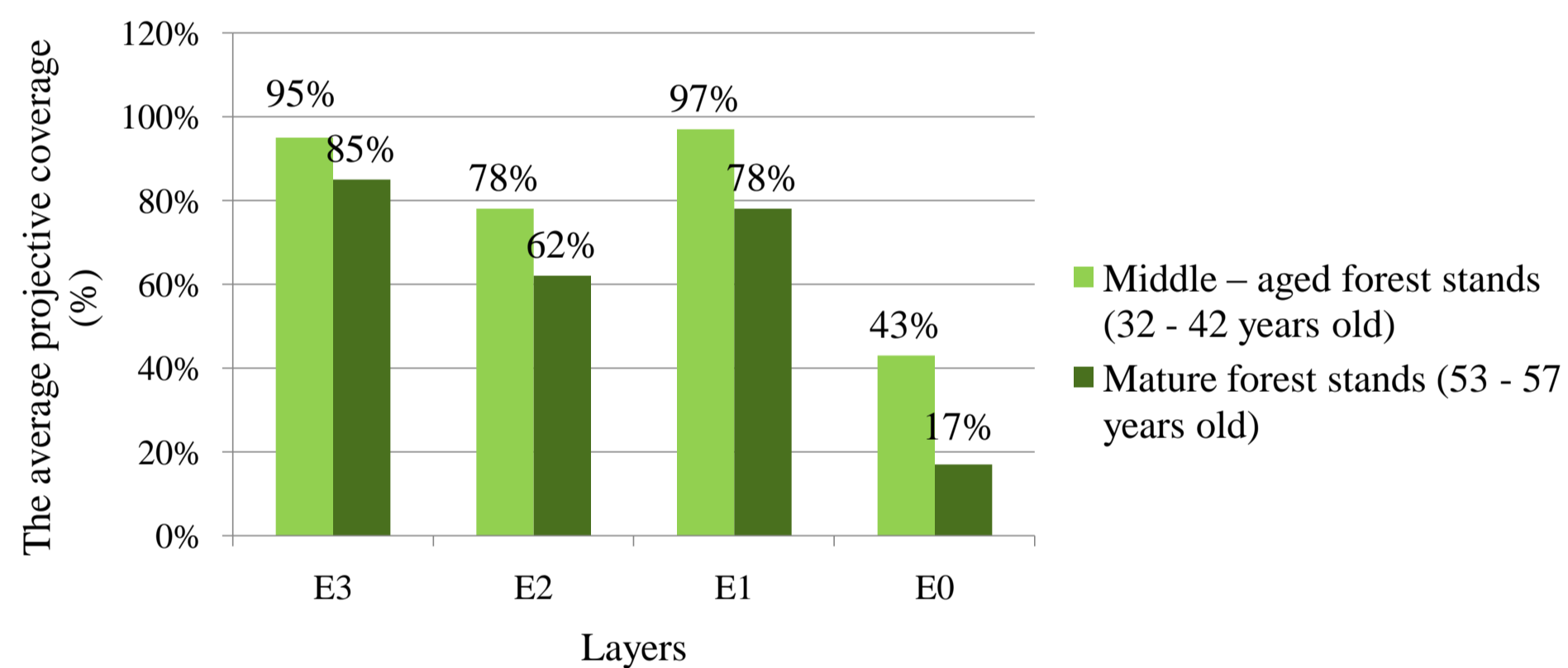


Fig. 4. The average projective coverage (%) by stands and within different age classes.

Ellenberg's mean indicator values were not significantly differ between middle – aged and mature forest stands.

The average volume of living trees, snags and downed logs were higher in mature forest stands.

## Conclusions

1. The most frequent species are *Alnus incana* (L.) Moench, *Quercus robur* L., *Fraxinus excelsior* L., *Acer platanoides* L., *Padus avium* Mill., *Corylus avellana* L., *Geum rivale* L., *Aegopodium podagraria* L., *Stachys sylvatica* L. and *Urtica dioica* L. (frequency class V).
2. Temperate warm partial shadow/partial light conditions, damp and nitrogeny soil and neutral reaction of soil are characteristics of woods of grey alder.
3. The average volume of the living trees was 233,2 m<sup>3</sup> ha<sup>-1</sup> in middle – aged forest stands and 436,6 m<sup>3</sup> ha<sup>-1</sup> in mature forest stands.
4. The average volume of coarse woody debris was 5,9 m<sup>3</sup> ha<sup>-1</sup> in middle – aged forest stands and 21,6 m<sup>3</sup> ha<sup>-1</sup> in mature forest stands.
5. The gap dynamics showed that in mature forest stands more meadow type species were occurred because in these forest stands are better light conditions than in middle – aged forest stands.

